smartEn Recommendations for Connection Code Amendments

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smartEn members

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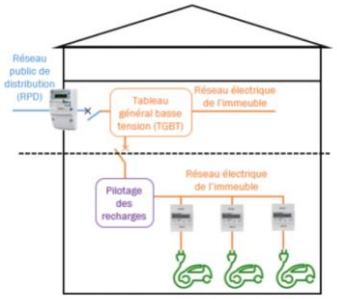
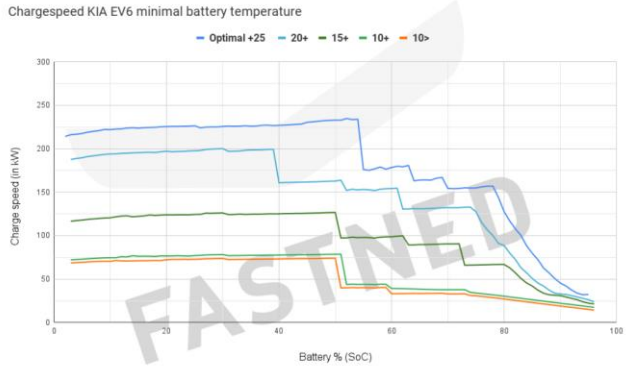
Smart Energy Europe

Facts about EV charging/discharging

- Most EVs will be connected at Mixed Customer Sites
  - In homes and buildings with loads, heat pumps and stationary storage
  - In parking lots with photovoltaics carports
  - Buildings parking lot can easily have dozens of chargers => Example : 20x7.4kW chargers
    - Load balancing usually implemented (between EVs and between building and parking)
  - Characteristics of all these behind the meter resources are fungible - Diversity factor should be taken into account



- EVs are not always connected – they come and go at random
  - and sometimes are in inactive mode
- Drivers decide when and how they want to charge/discharge
  - Power / Max-Min State of charge
- EVs charging/discharging curves are not linear.
  - Charge/discharge is slower at high/low state of charge
  - Temperature also impacts charge/discharge speed/power



- A 'dumb' charging EV is just another load
- Electric Vehicle Supply Equipments (EVSE) are always supplied in low voltage (230V/400V)

smartEn welcomes ACER revision of codes

- Current connection codes are not fit for DER and V2G – They do not leverage the capabilities of smart inverters

- **Pan-European harmonization of connection codes and of data interfaces will remove some of the biggest barriers to V2G scale up**

- Requirements for V2G (both technical and certification process) are significative – They should be proportional to capabilities, relevant and not slow down generalization of V2G or block the monetization of flexibility on markets

smartEn views on ACER initial draft proposal

- In return for meeting connection code requirements, DER such as V2G should be granted full access to all flexibility mechanisms to monetize their capabilities
- Level playing field
  - Same certification requirements should apply to EV chargers as to heat pumps, PV and storage inverters or electrolysers
  - Thresholds should be the same or tend towards harmonization
  - V1G / storage unit should be considered as a load and NC RfG should apply only if generating in parallel to the Grid
- Given the high pace evolution of technologies and uses, the connection code should also give a vision and possibly a roadmap

smartEn recommandations

- There should be no distinction between AC and DC charging

- Grid user capabilities
  - Certification of both grid connection and flexible capacity at the same time should be possible
  - “How” capabilities are used should not be in the Grid Connection codes (but in the Flexibility code of SOGL)
  - Operational certification could include some localization-specific compliance

- LFSM-U/O requirements for EVs cannot be higher than for any other DER with PPM
  - EVs are more volatile (and less reliable) resources, since their capabilities vary along their operating mode, connection, state of charge, driver needs, …

smartEn recommendation :

Interfacing

- Data interface harmonization should be IEC 61850 for conformity with the other connection codes and the SOGL
  - Remote power control with standards for both active and Reactive Power (such as IEC 61850-7-420)
- Standards should be set in Implementation Guidelines (so that if the standard change, no need to change the code)

- DSO control through a logic interface should be **limited to emergencies and post-market measures** –
  - ie EV charging DSO curtailment should be allowed only if a local flexibility market exists

- Logic interface has to meet cybersecurity network code requirements

smartEn recommendation :

Maximum capacity at grid tie point

- **Connection codes should apply at the grid-tie point**
  - Mixed Customer Sites may impact connection process but should not impact required certification of assets
    - Eg connection points of homes and small buildings as the relevant reference rather than the individual behind the meter assets (EV chargers, rooftop PV, heat pumps, storage)
  - Allows for smart alternatives when grids are technically constrained
    - E.g. Dynamic power limitation
  - Any operational limitation (by DSO) should be defined at grid-tie point
    - Eg curtailment by the smart meter
- Power level to be considered at the grid connection point to apply the code should be calculated on maximum export capability (and not Pmax of EVs behind the meter)
  - EVs are controllable assets, they can soak excess behind-the-meter power
- Enable those DERs that are compliant with the connection codes to provide their flexibility even if not all DERs behind the grid-tie point are compliant with the codes' requirements
  - If new significant devices are added behind the meter, new requirements should only apply to them – and not to pre-existing devices

smartEn recommendation :

Type-testing

- Allow a faster approval through approved type-test approach for homologation
  - Replaces on-site certification
  - type-tests by family of products
  - equivalence between products
  - Certification of inverters on their grid fault response
    - Whether in vehicle or in external charger
  - Type test certification should include tests for the communication protocol
  - For advanced functionality interoperability conformity, tests should be performed based on use cases from either simulated or return experiences to enrich TSOs/DSOs and manufacturers' knowledge
  - 'Submetering' testing and validation

- Pan European test certification
  - testing rules to be harmonized across Europe - Associated repositories should be organize to facilitate reuse of approvals across European countries
  - family grouping features have to be harmonized across the Member States for free circulation across Europe

Remarks / Questions to ACER

- A clear definition of the generation module is required
    - AC wallbox ? ICCB (In-cable control box for Mode 2)? DC EVESE?
    - On Board Charger ? Complete vehicle?
    - EVSE+EV?
- Why a threshold at 2.4kW?
    - Do you really expect V2G in mode 2 to be allowed by national safety codes?
    - If Mode 2 V2G is allowed, how to ensure compliance in Type B MCS?
    - Frequency thresholds/ramps are not the same across Europe : how can the ICCB cope?
- Why a threshold of 3 EVs for determination of compliance?
    - 3 vehicles at 3.5kW=11kW ; 3 vehicles at 1MW=3MW
    - Power rating seems much more relevant
- 44kW threshold will always be reached in multi-dwelling garage
    - But will not apply if the public network supplies each slot individually
- LFSM will add cost to EVSE (Frequency meter)
- Grandfathering? Or applicability to existing installations?
- What is a ‘compliance statement’? Is a self-declaration deemed sufficient for EV2? Could it be a digitalized process, with a limited time for the DSO to reply, with an interface in English?

Thanks

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“ appendix ”

Definitions in AFIR

- '**smart recharging**' means a recharging operation in which the intensity of electricity delivered to the battery is adjusted in real-time, based on information received through electronic communication;
- '**recharging point**' means a fixed or mobile interface that allows for the transfer of electricity to an electric vehicle, which, whilst it may have one or several connectors to accommodate different connector types, is capable of recharging only one electric vehicle at a time, and excludes devices with a power output less than or equal to 3,7 kW the primary purpose of which is not recharging electric vehicles.
- '**bi-directional recharging**' means a smart recharging operation where the direction of the electricity flow may be reversed, allowing that electricity flows from the battery to the recharging point it is connected to;